

# Polio in the United States: Fear and then Victory

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American summers are known to most kids as carefree days splashing in swimming pools or making castles in sand boxes. But in the 1950s, these places of innocence were forbidden by parents fearful of the polio virus that was striking young children and adults suddenly and without mercy.

Dr. Jeffrey Koplan, former director of the Centers for Disease Control and Prevention, remembers looking out the window and seeing his neighbor, a young mother of two, being carried to a car, her legs limp. She was back in two weeks, this time in a wheelchair. This was every family's nightmare. And it was a reality for 20,000 polio victims in the United States every year.

Because some of the first symptoms are fatigue and fever, parents could not tell if their child suffered from flu or polio. As a precaution, many rushed to the hospital.

Children and adults experienced long lines at some hospitals trying to gain access to emergency rooms. Doctors fanned out to examine patients waiting in their cars. Once in the hospital, they were subjected to spinal taps, orthopedic surgeries and braces. They were kept in isolation wards where even their parents couldn't visit them. Some were so paralyzed that they couldn't breathe and had to spend months and sometimes years confined to mechanical ventilators known as iron lungs, which allowed only the head to protrude. In February 2007, an American woman who was struck by polio in 1950 celebrated her 60th birthday, still in an iron lung.

While the public panicked, they also mobilized. President Franklin D. Roosevelt, who contracted polio as a child and lead the country for 12 years using a wheelchair or a cane, had already founded The March of Dimes ([www.marchofdimes.com](http://www.marchofdimes.com)), a national foundation to raise money for polio research. The March of Dimes still works on behalf of children with disabilities. In the 1950s, its volun-

teers went door to door asking for donations. Mothers marched in the streets. And scientists raced to discover a vaccine.

One of them was Dr. Jonas Salk at the University of Pittsburgh in Pennsylvania. Thanks to Nobel Prize winners John F. Enders, Thomas H. Weller and Frederick C. Robbins for their discovery of the ability of poliomyelitis viruses to grow in various types of tissue cultures, Salk and his colleagues developed a potentially safe, injectable vaccine against polio. But before they could give it to the public, they had to test its safety and effectiveness. The vaccine was given to nearly 15,000 Pittsburgh residents, mostly children, in pilot trials from 1952 to 1954. Then, Dr. Thomas Francis, Jr. at the University of Michigan, and the March of Dimes, conducted the largest field trials in U.S. history, involving 1.8 million children, called "Polio Pioneers." The trials used the now standard double-blind process for the first time, where neither patients nor administering physicians knew whether an inoculation was a vaccine or a placebo.

In April 1955, the Salk vaccine was declared a success. The following month, first and second grade children lined up for mass inoculations. Salk's discovery opened the eyes of the world to the power of scientific research. Both in the United States and around the world, it showed how scientific solutions developed in basic research laboratories could lead to practical applications for complex problems at the core of human health.

But national relief turned into national heartbreak when a bad batch of vaccines caused 260 cases of polio and 10 deaths. Vaccinations were suspended for three weeks, resulting in one of the largest outbreaks of polio in U.S. history.

Dr. Neal Nathanson, who worked for the Centers for Disease Control and Prevention, vividly recalls the time. "People began to question that if this product was unsafe, how do we know that every other vaccine is safe? The credibility of the Public Health Service was also on the line."

Overnight, the center's chief epidemiologist, Dr. Alexander D. Langmuir, set up the Polio Surveillance Unit to investigate the outbreak. The unit gathered data from state health departments around the country, which received reports from local health departments on every case of polio.

The center issued daily reports on its investigation. The *New York Times* printed the reports on its front page for a month, underscoring the national attention that the outbreak received.

"Investigation revealed that the source was from two lots of vaccine from a single manufacturer—the Cutter lab," Nathanson recalls.

With the cause of the outbreak isolated by the Centers for Disease

*Dr. Jonas Salk (right), a scientist who discovered the polio vaccine, administers an injection to a schoolboy in Pittsburgh, Pennsylvania, during pilot trials in 1954.*



*President Franklin D. Roosevelt, who contracted polio as a child, used crutches and a wheelchair, but was rarely photographed doing so in public. Here he is shown at his private home in New York, with his dog, Fala, and Ruthie Bie, granddaughter of the caretakers.*

Control and Prevention, a moratorium on the vaccine from the other manufacturers was lifted.

The quick work helped allay fears, rescue the vaccine program, and restore public confidence in the vaccine and the U.S. Public Health Service. In 1960, just 2,525 polio cases were reported. In 1965, just 61 cases. By 1979, zero cases. But even today, American children are vaccinated against polio. As long as the virus exists somewhere in the world, everyone is vulnerable.

The event led the federal government to establish more stringent standards for manufacturing vaccines and for testing the safety of products in general. Before a vaccine is licensed, manufacturers must provide a full production history and a consistent positive outcome on product safety testing.

Why was polio a new problem? Ironically, it was because of the advances in hygiene and the growth of the American middle class. Previously, infants contracted the polio virus but produced no or few symptoms because they were protected by the antibodies in their mothers' milk. So instead of becoming sick, they became immune. With advancements in sewage systems, American homes and communities became cleaner, and infants did not have contact with the virus and therefore did not acquire immunity. So if they encountered the virus after they were no longer nursing, they were vulnerable.

Fortunately, only one percent of those who contract polio actually become paralyzed. But even for the survivors, polio does not end with childhood symptoms. Today, some 70 percent of polio survivors in the United States are experiencing post polio syndrome, a weakness in muscles that were not affected when they had polio as a child. As these survivors age, they can experience fatigue, pain, and difficulty swallowing and breathing.

Fortunately, they will be the last Americans to deal with this disease.

